IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl.No.: 09/920,479 Confirmation No.: 5575
Appellant: Paksoy et al
Filed: August 1, 2001
TC/AU: 2654
Examiner: Chawan

Docket: TI-31551
Cust.No.: 23494

APPELLANTS' BRIEF

Commissioner for Patents
P.O.Box 1450
Alexandria VA 22313-1450

Sir:

The attached sheets contain the Rule 41.37 items of appellants' brief. The Commissioner is hereby authorized to charge the fee for filing a brief in support of the appeal plus any other necessary fees to the deposit account of Texas Instruments Incorporated, account No. 20-0668. A fee transmittal sheet is enclosed.

Respectfully submitted,

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Rule 41.37(c)(1)(i) Real party of interest

Texas Instruments Incorporated owns the application.

Rule 41.37(c)(1)(ii) Related appeals and interferences

There are no related dispositive appeals or interferences.

Rule 41.37(c)(1)(iii) Status of claims

Claims 1-6 are pending in the application with claims 3-6 objected to and claims 1-2 finally rejected. This appeal involves the finally rejected claims.

Rule 41.37(c)(1)(iv) Status of amendments

There is no amendment after final rejection.

Rule 41.37(c)(1)(v) Summary of claimed subject matter

The invention provides a method (claim 1) and apparatus (claim 2) for digital speech decoding to give a wideband (0-8 kHz) speech signal by combining a lowband (0-4 kHz) decoded speech signal plus a highband (4-8 kHz) speech signal synthesized using an excitation made from noise modulated by a portion of the decoded lowband signal applied to a highband linear prediction synthesis filter. The lowband portion used for noise modulation is adaptively smoothed over time. Application Fig.1c shows a preferred embodiment using the 2.8 – 3.8 kHz portion of the lowband for noise modulation; application page 12, steps (8)-(9) describe the highband excitation and step (10) the highband synthesis. Explicitly, the first sentence of step (9) describes the excitation for the highband as the product of noise and the smoothed waveform sm[n](m) that derives eventually from lbdh(m). And lbdh(m) is the lowband decimated high portion. Thus the excitation for the highband derives from the lowband, but the synthesis filter (linear prediction) for the highband is extracted from the original highband speech and encoded.

Rule 41.37(c)(1)(vi) Grounds of rejection to be reviewed on appeal

The grounds of rejection to be reviewed on appeal are:

(1) whether claims 1-2 are patentable over the Tucker reference in view of the Smyth reference and further in view of the Akamine reference.

Rule 41.37(c)(1)(vii) Arguments

(1) Claims 1-2 were rejected as unpatentable over Tucker in view of Smyth ('762) and Akamine. The Examiner pointed to Tucker for linear prediction of speech coding with an encoded lowband plus a noise excited highband, added Smyth '762 to show modulated noise for the highband, and added Akamine for adaptive smoothing.

Appellants reply that Tucker (Fig.2 and col.6, ln. 47-57) show white noise exciting a linear predictive filter ("Spectral shaping 23" in Fig.2) but do not suggestion modulating this white noise excitation with a portion of the lowband signal as required by claims 1-2. And Smyth does not suggest modulating this noise excitation simply because Smyth does not deal with linear prediction of speech coding.

Explicitly, Smyth deals with DPCM (differential pulse coded modulation) audio and uses filterbank decomposition (Figs.4a-4b have 32 frequency bands for baseband and 8 frequency bands for high frequencies) and thereby transforms into the frequency domain; see Smyth column 3, lines 25-43 noting that the high frequencies are coded independently of the baseband. Further, Smyth decodes (e.g., column 12, lines 9-30) by the usual for differential coding by using predictors for samples derived from previously decoded samples. (The cited column 9, lines 9-30 only notes decoding of various frequency ranges.) In short, Smyth does not relate to linear prediction of speech with its synthesis filter and filter excitation as in Tucker and claims 1-2; so Smyth cannot suggest a modulated noise excitation for Tucker because Smyth does not relate to the same technology as Tucker.

Consequently, the claims are patentable over the references.

Rule 41.37(c)(1)(viii) Claims appendix

1. A method of wideband speech decoding, comprising:

(a) decoding a first portion of an input signal as a lowband speech signal;

(b) decoding a second portion of an input signal as a noise-modulated excitation of a linear prediction encoding wherein said noise modulated excitation is noise modulated by a portion of the results of said decoding as a lowband speech signal of preceding step (a) and adaptively smoothed; and

(c) combining the results of foregoing steps (a) and (b) to form a decoded wideband speech signal.

2. A wideband speech decoder, comprising:

(a) a first speech decoder with an input for encoded narrowband speech;

(b) a second speech decoder with an input for encoded highband speech and an input for the output of said first speech decoder, said second speech decoder using excitation of noise modulated by a portion of the output of said first speech decoder and adaptively smoothed; and

(c) a combiner for the outputs of said first and second speech decoders to output decoded wideband speech.

Rule 41.37(c)(1)(ix) Evidence appendix

none

Rule 41.37(c)(1)(x) Related proceedings appendix

none